CHAPTER 5

CONCLUSIONS

The associations between the gobiid fishes and the alpheid shrimps were investigated at Kang Kao and Sichang Islands the inner part of the Gulf of Thailand. These associations occurred mainly in the shallow area, especially the area surrounding the coral zone, where the sediment is composed of sand packed with shell and coral fragments. Occurrence of these associations is high on the eastern side of Khang Khao Island due to the effect of wind and wave.

Twelve species belonging to four genera of gobiid fishes ; *Myersina macrostoma*, *Myersina* sp.A,*Ctenogobiops pomastictus*, *Cryptocentrus caeruleomaculatus*, *C. singapurensis*, *C. cyanotaenia*, *C. cinctus*, *Cryptocentros* sp.1, *Cryptocentrus* sp.2, *Amblyeleotris fontanesii*, *A. gymnocephala* and *Amblyeleotris* sp.1 and six species of alpheid shrimps from the genus *Alpheus* belonging to the brevirotris group ; *Alpheus djiboutensis*, *A. bellulus*, *A. distinguensus*, *A. rapacida?*, *Alpheus* sp.1 and *Alpheus* sp.A were found and collected in this study. There is also an uncollected alpheid shrimp recorded. The gobiid fishes of the genera *Myersina* and *Ctenogobiops* are for the first time in this study recorded to be found in the Thai waters. There are three species of gobiid fishes and one of alpheid shrimp found to be new to science, two of *Cryptocentrus*, one of *Amblyeleotris* and one of *Alpheus*. There are still one species of *Myersina* and one species of *Alpheus* which could not be specificly identified in this study.

Two association pairs *Cryptocentrus singapurensis-Alpheus djiboutensis* and *Cryptocentrus* sp.1-*Alpheus bellulus*, predominant in this area were selected for behavioural study both in the field and laboratory. Behaviour patterns outside the burrow of these two association pairs were investigated in natural condition quantitatively. Behaviour patterns of these two pairs, both gobiid fishes and alpheid shrimps, are clearly different. The associations between *Cryptocentrus* sp.1-*Alpheus bellulus* show closer relationship than the other one. Greater development of their tactile alarm communication system may explain these differences. In general, behavioural activities outside the burrow of the gobiid fishes are mainly those of feeding and guarding, whereas burrow maintainance was the main behaviour outside the burrow of the alpheid shrimp. Behaviours outside the burrow of the alpheid shrimps were limited by guarding of the goby. Inside burrow, behaviours of these two pairs were observed in laboratory. They did not show the differences in their behaviour inside the burrow. The goby had a low level of activities whereas the alpheid shrimp was very active. The dominant behaviour inside the burrow of alpheid shrimp was burrow maintainance, but food storage behaviours were also observed in both species. Antennal contact inside the burrow had been observed.

The relationship of the gobiid fishes and alpheid shrimps seems essentially to be association with the sharing of space in the burrow by the alpheid shrimp and guarding by the goby. But food and other requisites, such as cleaning activities may also play important roles in the relationship of these associations. The degree of relationship of these associations depended on the development of their communication

system, which is affected directly by other behavioural activities of both gobiid fishes and alpheid shrimps.

The associations between gobiid fishes and alpheid shrimps, still leave many interesting aspects which are unclear in reasons for those behaviours, for example ; pair formation of alpheid shrimps which is still lack of evidence to show how a solitary shrimp get its mate ; colour variations of gobiid fishes which might be concerned with sex reversal, changes of social state or environmental adaptation, etc.. Nature of these associations still need evidences to support those observed phenomena. However, difficulties in collecting specimens for studies prohibited more studies on these aspects. Therefore, development of suitable and effective methods for collecting specimens are needed.

Analysis of animal behaviour can be very useful it properly applied in various aspects, for example, taxonomic study and aquaculture. In taxonomic study, traditionally many characteristics of animal are used to distinguished and classified them according to the right taxonomic position. In many circumstances morphologically they might not show much differences, therefore other disciplines have to be taken into consideration, i.e. genetic, behavioural study. Not only for taxonomic work, many species of fishes can not be distinguished morphologically between male and female but behaviour analysis can help observers to easily identify behaviour of male and female. In aquaculture, behaviour study is very important. In order to rear them well, knowing about the cultured animals, such as feeding behaviour, will help in designing the appropriate way to feed the animal effectively. Knowledge about animal behaviour will help those who are working in aquaculture to understand their organisms better which will bring to sucessful aquaculture mangement system.